

# Plastic Tube Flaring System



## Model FTF 1000 User's Manual

<b>Safety Instructions</b> .....	2
<b>General Information</b> .....	2
<b>Setup</b>	
Tubing Selection and Preparation .....	3
Flaring System Setup .....	4
<b>Operation</b>	
Heating .....	5
Flaring .....	6
<b>Shutdown and Storage</b> .....	7
<b>Tube Flaring Length Guide</b> .....	8
<b>Good Flares</b> .....	8
<b>Troubleshooting</b> .....	9
<b>Replacement Parts</b> .....	11
<b>Warranty</b> .....	11

## Safety Instructions

READ THIS MANUAL BEFORE USING THE SWAGELOK® TUBE FLARING SYSTEM.

This device is electrically powered and must be operated in a safe environment to avoid risk of fire, explosion, or electric shock.

### Statements



#### CAUTION!

Statements that identify conditions or practices that could result in damage to the equipment or other property.



#### WARNING!

Statements that identify conditions or practices that could result in personal injuries or loss of life.

### Symbols



#### PINCH POINTS

Keep hands, loose clothing, and long hair away from moving parts. Serious injury can occur.



#### HOT SURFACE

Heating unit of flaring system and heated tubing will be very hot during operation.

### General Information



#### WARNING!

##### NO USER SERVICEABLE COMPONENTS INSIDE

The FTF 1000 plastic tube flaring system contains no user-serviceable parts, except for fuses. Contact your authorized Swagelok® sales and service representative for service.



#### WARNING!

DO NOT EXPOSE FLARING TOOL TO MOISTURE. SYSTEM COMPONENTS ARE NOT WATERPROOF.

### Technical Data

Ordering Number	Power Requirements	Maximum Current
MS-FT-1-1	115 V (AC), 50/60 Hz	4 Amps
MS-FT-1-3		
MS-FT-1-5		
MS-FT-2-2	230 V (AC), 50/60 Hz	2.5 Amps
MS-FT-2-4		
MS-FT-2-6		
MS-FT-2-7		
MS-FT-2-8		

### Ground and Extension Cord Information

Tube flaring system **MUST** be grounded against electrical shock. It is equipped with a three-wire conductor and three-prong plug to fit a grounded receptacle.

#### NEVER CONNECT THE GREEN OR GREEN/YELLOW WIRE TO A LIVE TERMINAL!

Use only three-wire extension cords that have three-prong, grounding-type plugs and three-pole receptacles. The extension cord wire size must meet the following specifications:

For 0 to 25 ft (0 to 7.5 m), the recommended minimum wire gauge is 14 AWG or 2.5 mm.

For 25 to 50 ft (7.5 to 15 m), the recommended minimum wire gauge is 12 AWG or 4.0 mm.

## Setup

### Tube Selection and Preparation

The Swagelok FTF 1000 plastic tube flaring system is designed to flare fluoropolymer tubing for use with fine thread flare end connections.

The following tubing sizes can be flared on this system:

Tubing Size in.	Wall Thickness in.
1/4	0.047
3/8	0.063
1/2	0.063
3/4	0.063
1	0.063

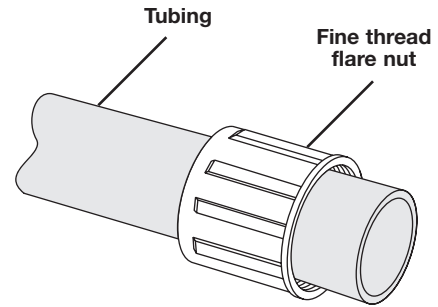


Fig. 1

1. Select appropriate size of tubing.
2. Tubing must be clean and free of grease, dirt, and other contaminants.
3. Cut the end of the tubing to be flared square ( $90^\circ \pm 10^\circ$  recommended).
4. Insert the cut end of the tubing through the fine thread flare nut. See Fig. 1.

Flaring System Setup

- 1. Select an appropriate location that is clean, well lit, well ventilated, and away from flammable fumes and materials.
- 2. Set the system on a flat, stable surface.
- 3. Insert the **power cord** into the side of the system. See Fig. 2.
- 4. Plug the other end of the power cord into a power source appropriate for the voltage of the system.
- 5. Turn on the system using the **switch** just above the power cord.
- 6. Set the heat temperature, heating time, and cool down time by pressing and holding down the appropriate button on the control panel, “HEAT TEMP”, “HEATING TIME” or “COOLING TIME”. Use the arrow buttons to reach the desired setting according to the guidelines in Table 1 for the selected tubing. See Fig. 3.

Table 1 PFA 450 HP Settings

Tubing Size in.	Heat Temperature °C	Heating Time s	Cooling Time s
1/4	220	20	30
3/8, 1/2, 3/4, and 1	295	40	30

**Note:** Guidelines are based on DuPont™ Teflon® PFA 450 HP tubing. Adjustments may be needed due to material variation and type of tubing being used.

- 7. Wait for “Set Temperature Reached” indicator on the control panel to light, then proceed to Operation.

**Note:** If the flaring system is not operated for a period of approximately 2 1/2 hours, the system will automatically enter a standby mode with the heater shutting off and the system cooling. Press any button on the control panel to reactivate system, and then wait for “Set Temperature Reached” indicator on the control panel to light.

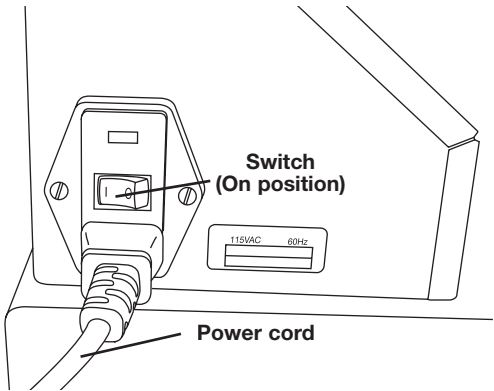


Fig. 2

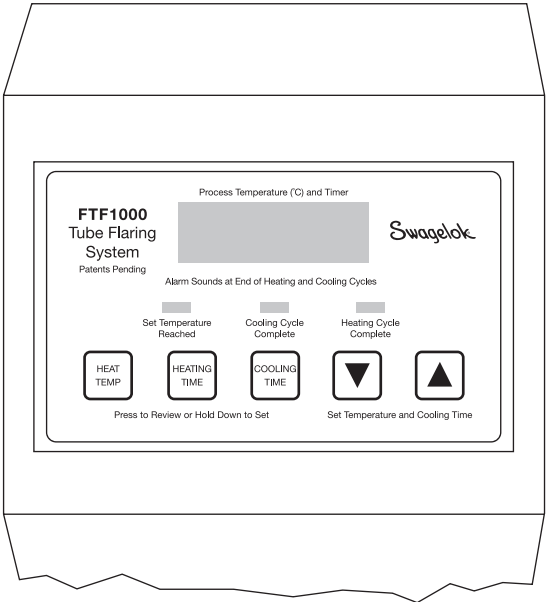


Fig. 3

## Operation

### Heating



#### **WARNING! HOT SURFACE**

**Surface of heater block will be extremely hot.  
Do not touch heater block.**

1. Retract **upper tube clamp** to the fully open position by moving the **clamping arm** in the direction shown. See Fig. 4.
2. Use the **ram arm** to match up the lines on the ram to the "START" position marked on the frame. The **ram arm** will reach a positive detent. See Figs. 4 and 5.
3. Insert prepared tubing into the appropriate size hole of the **heater block** until the tubing reaches the positive stop. See Fig. 6.

**Note: Each hole in the heater block is marked with the tubing size.  
See Fig. 7.**

4. The timer will start automatically with the system display showing the countdown to completion of the preset heating time. After heating has been completed an audible alarm will sound, and the "Heating Cycle Complete" indicator will blink.



#### **WARNING! HOT SURFACE**

**The end of the tube removed from the heating block will be extremely hot.**

5. Remove tubing from the heater block. If necessary, twist the tubing slightly to help with the tubing removal.

**Note: The tubing must be quickly placed on the appropriate flare mandrel upon removal or tubing will begin to cool.  
(See Flaring).**

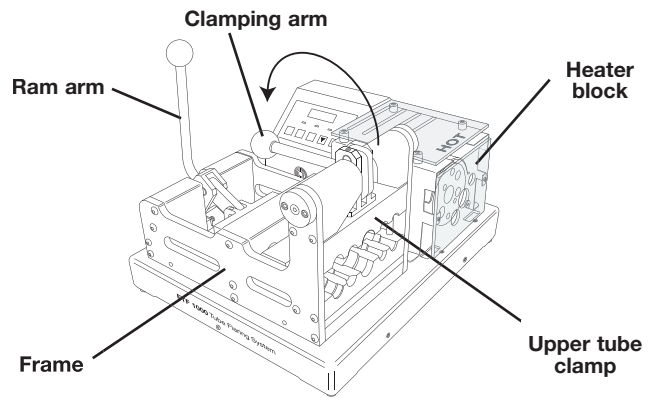


Fig. 4

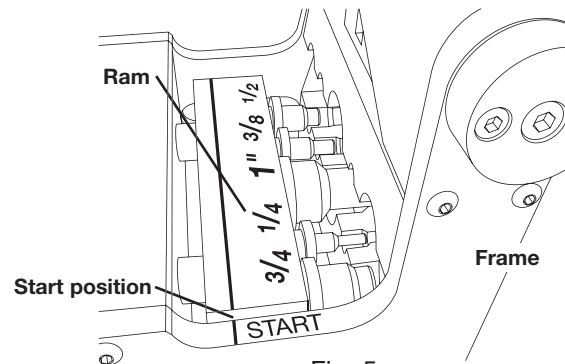


Fig. 5

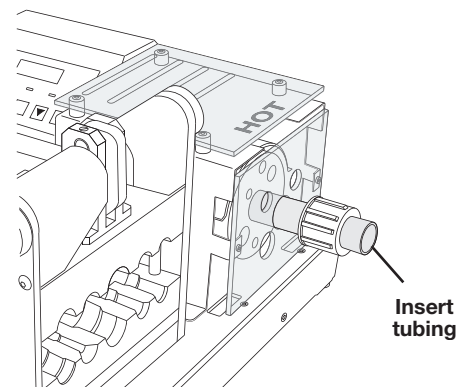


Fig. 6

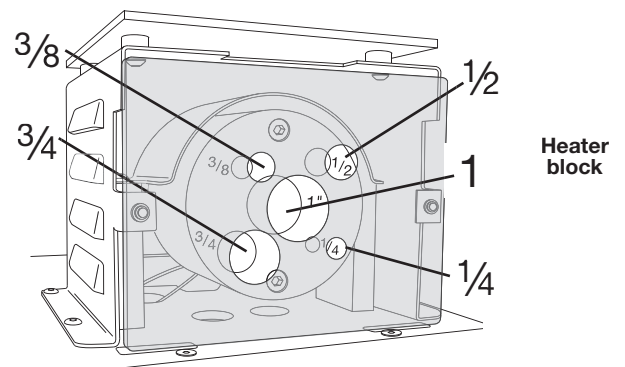


Fig. 7

## Flaring

1. Slide the heated tubing onto the appropriate sized flaring mandrel to the beginning of the chamfer.  
See Figs. 8 and 9.



### CAUTION!

It is important to place the tubing at the beginning of the chamfer.

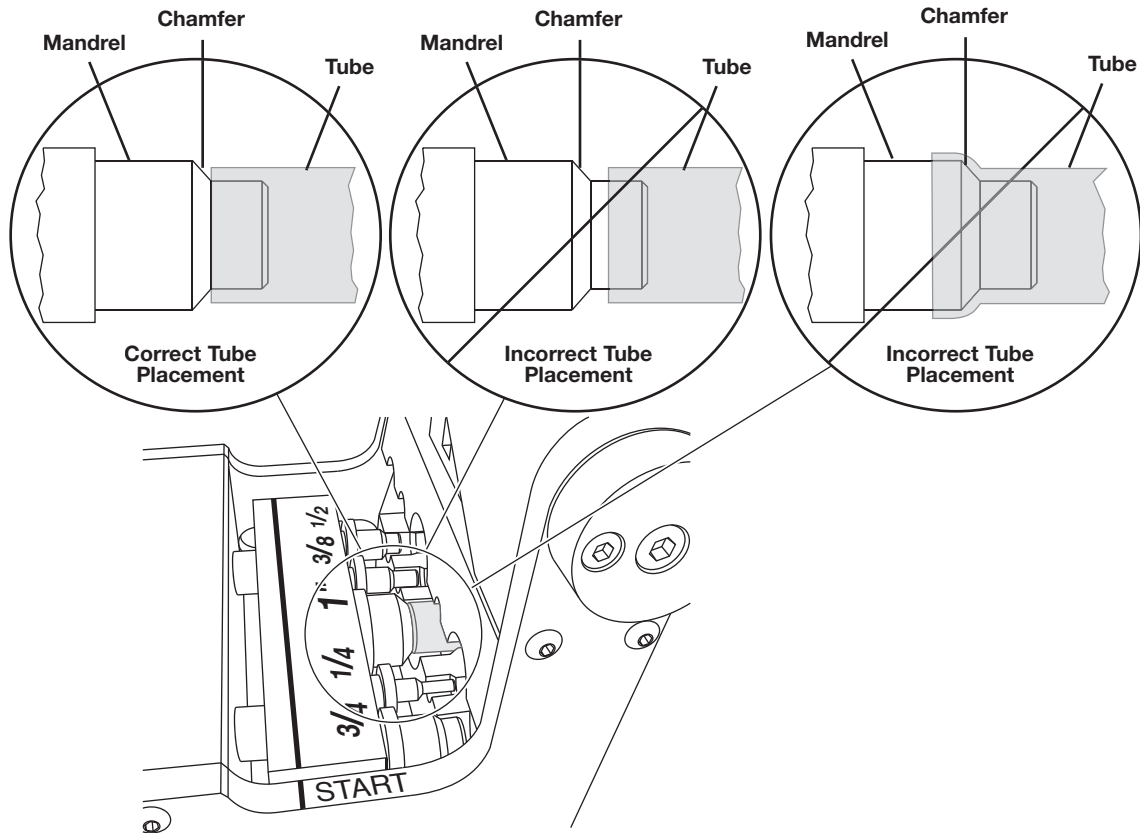


Fig. 8



### WARNING!

#### PINCH POINTS.

Be careful not to pinch fingers when clamping the tubing.

2. Quickly clamp the tubing by rotating the clamping arm completely forward until it locks into place.  
See Fig. 9.

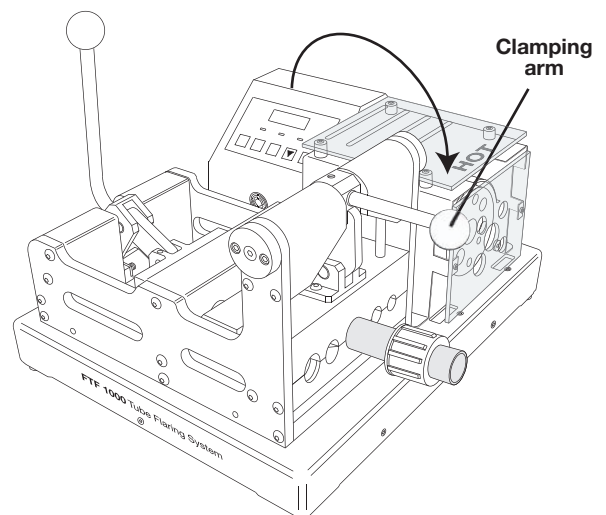


Fig. 9



**WARNING!**  
**PINCH POINTS**

Be careful not to pinch fingers when moving the ram forward with the ram arm.

3. Quickly move the **ram arm** completely forward until it locks into place. The timer will start automatically once the arm is completely forward. After the cooling time has been reached an audible alarm will sound and the "Cooling Cycle Complete" indicator will blink. See Fig. 10.
4. Return the **ram arm** completely to its original position, past the "START" position marked on the frame. See Fig. 8.
5. Return the **clamping arm** to the fully open position. See Fig. 12.
6. Remove the tubing. The flared tubing is ready for installation or storage.

**Note:** Return the ram arm back to the "START" line position marked on the frame. See Fig. 12.

## Shutdown and Storage

1. To shut the system down, turn off the power using the switch just above the power cord on the system.



**WARNING!**  
**HOT SURFACE**

The system will remain hot for 2 1/2 hours after the power is turned off. Do not place system back into case until it is fully cooled.

2. For storage, remove the power cord and place it inside the case. Place the system into the case.

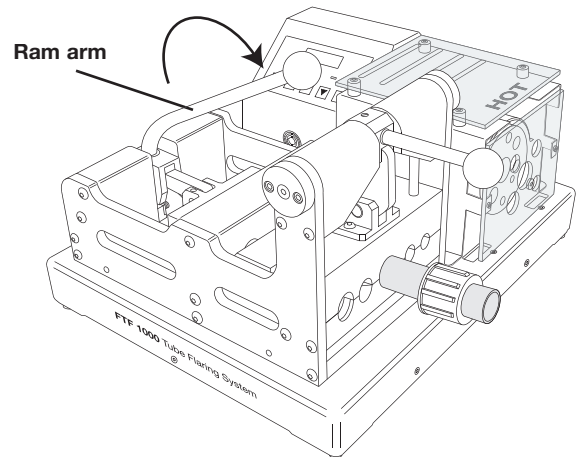


Fig. 10

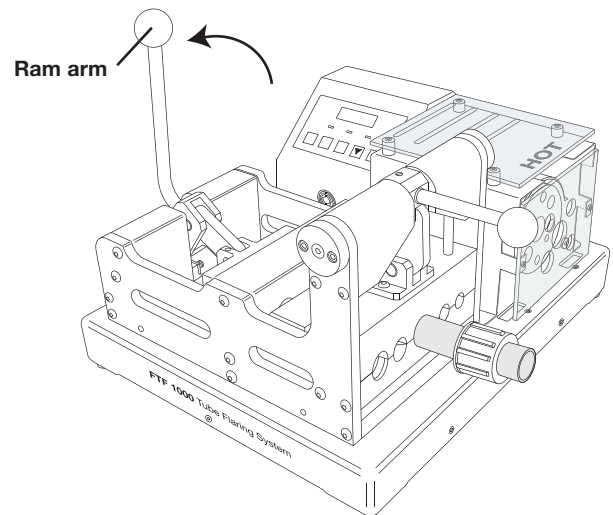


Fig. 11

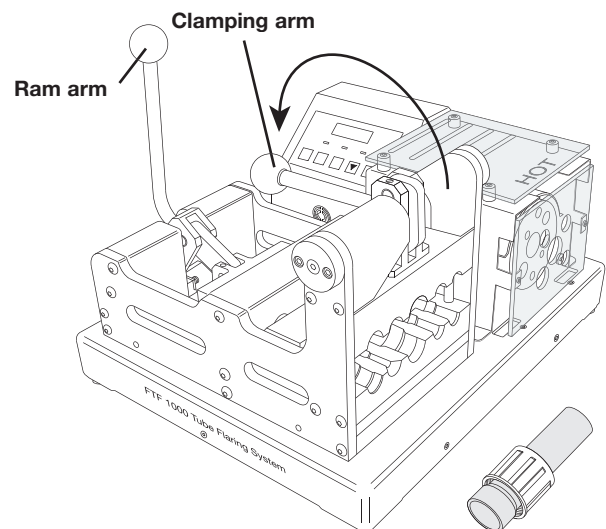


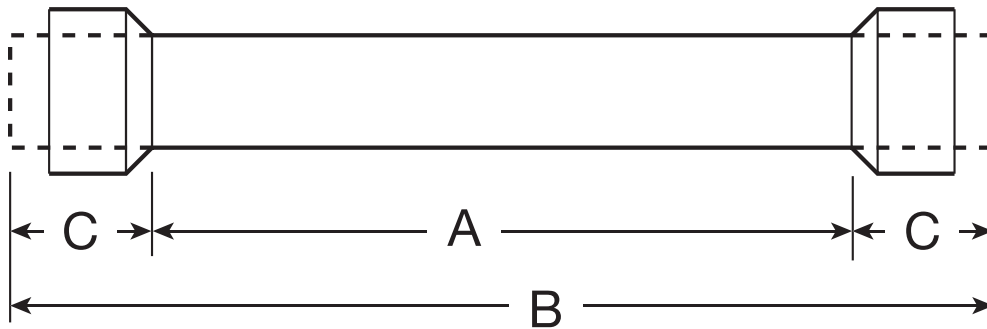
Fig. 12

## FTF 1000 Tube Flaring Length Guide

To determine the original length of tubing B needed to result in the desired length A.  
See below.

One end flared:  $B = C + A$

Two ends flared:  $B = 2C + A$



A = Final desired length from fitting nose to fitting nose

B = Original length of tubing required to obtain A

Tubing Size in.	Dimensions, in.	
	C	2C
1/4	0.55	1.1
3/8	0.6	1.2
1/2	0.6	1.2
3/4	0.6	1.2
1	0.7	1.4

## Good Flares

Good flares should be consistent around the circumference of the tubing. All angles should be sharp and consistent, with no deformed areas. See Fig. 13.

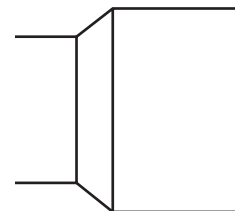


Fig. 13  
Good flare



## Troubleshooting

**Cause:** The temperature was set too high, the heating time was too long, or both. See Fig. 14.

**Solution:** Decrease the temperature and/or the heat time.

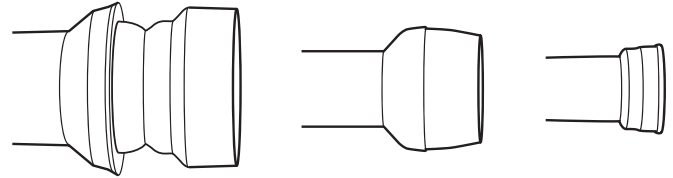


Fig. 14  
Temperature too high and/or heat time too long

**Cause:** The temperature was too low, the heating time too short, or both. See Fig. 15.

**Solution:** Increase the temperature and/or the heat time.

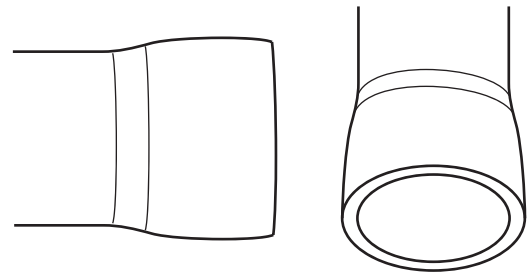


Fig. 15  
Temperature too low and/or heat time too short

**Cause:** The ram arm was too far back from the "START" position or the tubing was pushed past the beginning of the chamfer, causing the flaring mandrel to overtravel and deform the tubing. See Fig. 16.

**Solution:** Ensure that the start position alignment marks are properly aligned.

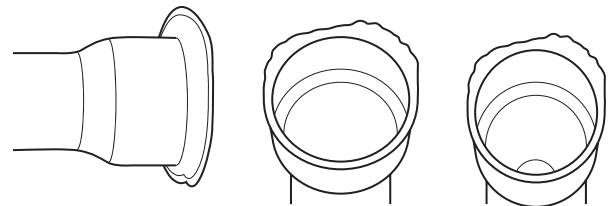


Fig. 16  
Improper ram position  
or tubing was pushed past chamfer

**Cause:** The tubing was not positioned at the beginning of the flaring mandrel chamfer. See Fig. 17.

**Solution:** Slide the heated tube all the way to the beginning of the chamfer.

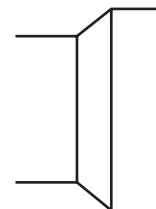


Fig. 17  
Improper tube position

## Adjusting the Photoeye Sensors

If the system does not respond to the tubing being inserted into the heater block, the two photoeye sensors may require adjustment. Each photoeye sensor is activated by different tubing sizes.

1. Turn the system off and ensure that it has cooled completely.
2. Lift the system from the front and allow it to rest on end.
3. Locate the two slotted access holes on the underside of the system. See Fig. 18.
4. Turn the system on.



### HOT SURFACE

**System will begin to heat up once it has been turned on.**

5. Adjust each photoeye sensor adjustment screw using a small, flat-blade screwdriver. Turn the screw(s) clockwise so that the LED turns orange, then counter clockwise until the LED first turns green.



### CAUTION!

**If the adjustment screws are over adjusted, the timer will run continuously.**

6. Turn the system off again and lower the system onto its base.

## Replacing the Fuses

The tube flaring system is protected by two 10A, 250V, 5 mm x 20 mm fast blow fuses. If the tube flaring system fails to power on, check both fuses for continuity.

1. Ensure that the tube flaring system is turned off and unplugged. Locate the fuse holder, which is integrated with the power cord receptacle. See Fig. 19.
2. Using a small, flat-blade screwdriver, gently pry open the fuse holder cover. See Fig. 19.
3. Gently pry the fuse holder from the cord receptacle. See Fig. 20.
4. Remove both fuses from the fuse holder and check for continuity. If either fuse has no continuity, the fuse has blown and must be replaced. Replace fuses with only the same type and rating. Spare fuses are available for purchase from your authorized Swagelok service center. See Fig. 21.
5. Reinstall the fuses, taking care that the fuses are fully seated against the positive stops on the fuse holder. See Fig. 21.



### CAUTION!

**The fuses must be properly installed and fully seated against the positive stops on the fuse holder.**

6. Reinsert the fuse holder into the cord receptacle and close the fuse holder cover.

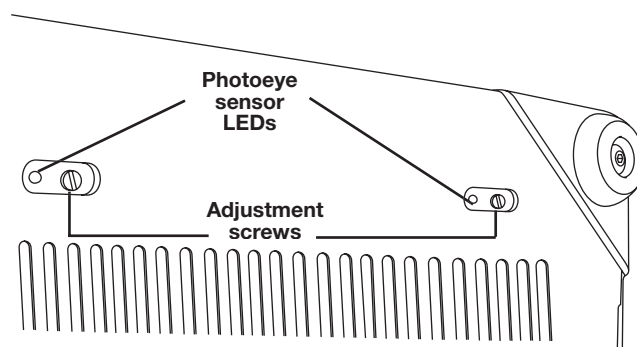


Fig. 18

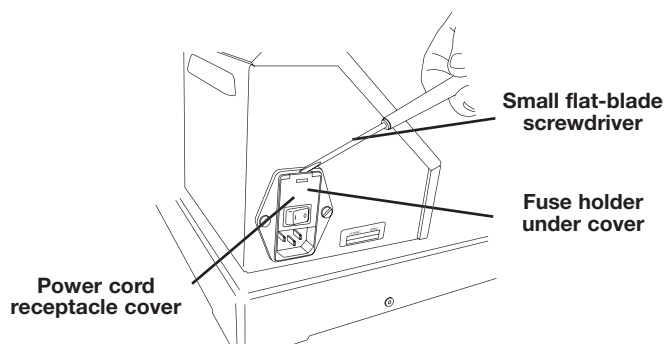


Fig. 19

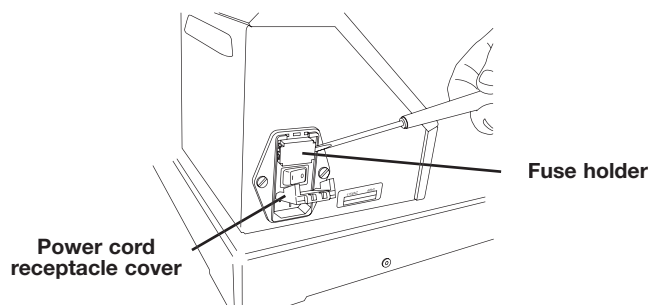


Fig. 20

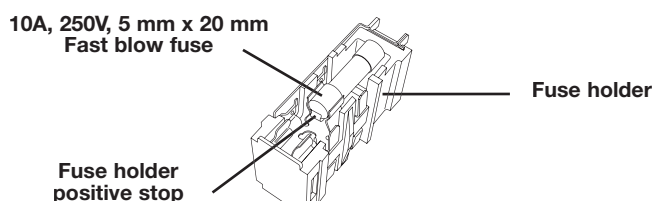


Fig. 21

## Replacement Parts

### Power Cords

Geographic Region	Voltage	Ordering Number
North America, Taiwan	110 V	MS-BTB-CORD-1
North America	220 V	MS-BTB-CORD-2
Japan	110 V	MS-BTB-CORD-3
Japan, Taiwan	220 V	MS-BTB-CORD-4
United Kingdom	110 V	MS-BTB-CORD-5
United Kingdom, Singapore	220 V	MS-BTB-CORD-6
Continental Europe	220 V	MS-BTB-CORD-7
China, Australia, New Zealand	220 V	MS-BTB-CORD-8

### Fuse

Ordering Number: MS-FUSE-G-S-10-250-A

#### The Swagelok Limited Lifetime Warranty

Swagelok hereby warrants to the purchaser of this Product that the nonelectrical components of the Product shall be free from defects in material and workmanship for the life of the Product. All electrical components installed in or on the Product are warranted to be free from defects in material and workmanship for twelve months from the date of purchase.

The purchaser's remedies shall be limited to replacement and installation of any parts that fail through a defect in material or workmanship.

**MANUFACTURER SPECIFICALLY DISAVOWS ANY OTHER REPRESENTATION, EXPRESS OR IMPLIED, WARRANTY, OR LIABILITY RELATING TO THE CONDITION OF USE OF THE PRODUCT, AND IN NO EVENT SHALL SWAGELOK BE LIABLE TO PURCHASER, OR ANY THIRD PARTY, FOR ANY DIRECT OR INDIRECT CONSEQUENTIAL OR INCIDENTAL DAMAGES.**

